

What is claimed is:

1. A thermoelectric transducing material comprising a layered cobaltite based substance represented by the chemical formula $A_x\text{CoO}_2$,
wherein A consists of an element or element group selected from alkali metal elements and alkali earth group elements and is compositionally modulated in a thickness-wise direction of layers in a structure of the layered cobaltite based substance.
2. The thermoelectric transducing material according to claim 1, wherein a value of x representing a composition ratio of A is not less than 0.2 and not more than 1.
3. The thermoelectric transducing material according to claim 2, wherein the value of x representing a composition ratio of A is not less than 0.3 and not more than 0.7.
4. The thermoelectric transducing material according to claim 3, wherein the value of x representing a composition ratio of A is not less than 0.4 and not more than 0.6.
5. The thermoelectric transducing material according to claim 1, wherein the thermoelectric transducing material comprises plural kinds of elements or element groups as A and A is compositionally modulated by layering $A_x\text{CoO}_2$ layers corresponding to the respective kinds of elements or element groups.

6. The thermoelectric transducing material according to claim 5, wherein the layering of $A_x\text{CoO}_2$ layers corresponding to the respective kinds of elements or element groups is repeated in a layering direction.

7. The thermoelectric transducing material according to claim 5, wherein the thermoelectric transducing material comprises plural kinds of elements or element groups including an alkali metal element and an alkali earth group element as A.

8. The thermoelectric transducing material according to claim 5, wherein the thermoelectric transducing material comprises two kinds of elements or element groups constituting A' and A'' as A, and A is compositionally modulated by layering an $A'_x\text{CoO}_2$ layer and an $A''_x\text{CoO}_2$ layer.

9. The thermoelectric transducing material according to claim 8, wherein A' is an element or element group consisting of an alkali metal element, while A'' is an element or element group consisting of an alkali earth group element.

10. The thermoelectric transducing material according to claim 9, wherein a thermoelectric transduction thermoelectric trasduction power factor P is $1.5 \text{ mW/K}^2\text{m}$ or more.

11. The thermoelectric transducing material according to claim 8, wherein A' is an element or element group consisting of an alkali metal element and a thickness of the $A'_x\text{CoO}_2$ layer is not less than 1 nm and not more than 3 nm.

12. The thermoelectric transducing material according to claim 8, wherein A'' is an element or element group consisting of an alkali earth group element and a thickness of the A''_xCoO₂ layer is not less than 2 nm and not more than 8 nm.

13. The thermoelectric transducing material according to claim 8, wherein a thickness of the A'_xCoO₂ layer is not less than 1 nm and not more than 3 nm, while a thickness of the A''_xCoO₂ layer is not less than 2 nm and not more than 8 nm.

14. The thermoelectric transducing material according to claim 13, wherein the thermoelectric transduction power factor P is 2 mW/K²m or more.

15. The thermoelectric transducing material according to claim 9, wherein A' is Na and A'' is Sr.

16. The thermoelectric transducing material according to claim 9, wherein A' is Na and A'' is K.

17. The thermoelectric transducing material according to claim 9, wherein A' is Na and A'' is Ca.

18. The thermoelectric transducing material according to claim 9, wherein A' is Na and A'' is Ba.

19. The thermoelectric transducing material according to claim 9, wherein A' is K and A'' is Ca.

20. The thermoelectric transducing material according to claim 9, wherein A' is K and A'' is Sr.

21. The thermoelectric transducing material according to claim 9, wherein A' is K and A'' is Ba.

22. The thermoelectric transducing material according to claim 9, wherein A' is Ca and A'' is Sr.

23. The thermoelectric transducing material according to claim 9, wherein A' is Ca and A'' is Ba.

24. The thermoelectric transducing material according to claim 9, wherein A' is Sr and A'' is Ba.

25. A method for producing a thermoelectric transducing material comprising a layered cobaltite based substance represented by the chemical formula $A_x\text{CoO}_2$ wherein A is an element or element group selected from alkali metal elements and alkali earth group elements,

the method comprising the step of layering, with use of an electro-discharge process, the layered cobaltite based substance represented by the chemical formula $A_x\text{CoO}_2$ on a substrate using a plurality of evaporation sources each comprising a layered cobaltite based substance represented by the chemical formula $A_x\text{CoO}_2$.

26. The method according to claim 25, wherein the plurality of evaporation sources includes two or more different kinds of layered cobaltite based substances.

27. The method according to claim 25, wherein the electro-discharge process is ion impact vapor deposition.